

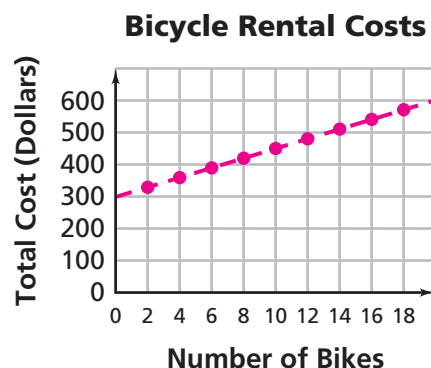
# Investigation

## 1

## Walking Rates

**I**n *Variables and Patterns*, you read about a bicycle touring business. You used tables, graphs, and equations to represent patterns relating variables such as cost, income, and profit. You looked at some linear relationships, like the relationship between cost and number of rental bikes represented in this graph:

Relationships that are represented by straight lines on a graph are called **linear relationships** or **linear functions**. From the graph, you see that the relationship between the number of bikes rented and the total rental cost is a linear function. In this investigation, you will consider the questions:



*How can you determine whether a relationship is linear by examining a table of data or an equation?*

*How do changes in one variable affect changes in a related variable? How are these changes captured in a table, a graph, or an equation?*

### 1.1

## Walking Marathons

**M**s. Chang's class decides to participate in a walkathon. Each participant must find sponsors to pledge a certain amount of money for each kilometer the participant walks. Leanne suggests that they determine their walking rates in meters per second so they can make predictions.

*Do you know what your walking rate is?*



## Problem 1.1 Finding and Using Rates

To determine your walking rate:

- Line up ten meter sticks, end to end (or mark off 100 meters), in the hall of your school.
- Have a partner time your walk.
- Start at one end and walk the length of the ten meter sticks using your normal walking pace.

**A.** What is your walking rate in meters per second?

**B.** Assume you continue to walk at this constant rate.

1. How long would it take you to walk 500 meters?
2. How far could you walk in 30 seconds? In 10 minutes? In 1 hour?
3. Describe in words the distance in meters you could walk in a given number of seconds.
4. Write an equation that represents the distance  $d$  in meters that you could walk in  $t$  seconds if you maintain this pace.
5. Use the equation to predict the distance you would walk in 45 seconds.



**ACE** Homework starts on page 12.

## 1.2 Walking Rates and Linear Relationships

**T**hink about the effect a walking rate has on the relationship between time walked and distance walked. This will provide some important clues about how to identify linear relationships from tables, graphs, and equations.

### Problem 1.2 Linear Relationships in Tables, Graphs, and Equations

Here are the walking rates that Gilberto, Alana, and Leanne found in their experiment.

Name	Walking Rate
Alana	1 meter per second
Gilberto	2 meters per second
Leanne	2.5 meters per second